

**ANALYSIS OF THE EFFECTIVENESS OF BUS SERVICES OUTSIDE OF CAMPUS  
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**ABSTRACT**

IPB Dramaga Bogor's Off-Campus Bus is one of the transportation programs to support IPB's civitas activities. IPB's Off-Campus Bus Program is also one of the supporting programs of IPB's green campus in 2020 Based on IPB Rector's Decree Number 205/IT3/LK/2015 concerning the implementation of the green movement campus 2020 in the IPB environment, one of which is green transportation. Purpose To get a calculation of the effectiveness of bus services outside the Dramaga IPB route Jl.Raya Sukasari, Jl. Raya KH Sholeh Iskandar and Jalan Pancasan ciapus in the year Conducting an analysis of the effectiveness of off-campus bus services in Dramaga IPB using the Likert scale method. The limitation of this research problem includes security , safety, comfort, affordability, equality and order. The method used in this study is the linkert scale. Based on the results of the discussion with the Likert scale method the results obtained in the form of a presentation score answer variable bus transportation services outside the campus Dramaga IPB of 67.87% and included in the class interval 60% -79.99% which means it is included in the Good category.

**Keywords:** campus bus; service standards; likert scale.

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**INTRODUCTION**

The IPB off-campus bus is one of the transportation programs to support the activities of the IPB community, which operates in the Bogor area to deliver the IPB community to the IPB Dramaga campus. This off-campus bus consists of 3 large buses with a capacity of 58 passengers (54 seats and 4 standing passengers). Meanwhile, the small bus consists of 3 small buses with a capacity of 27 passengers (25 seats and 2 standing passengers). The bus pick-up route outside the IPB campus is divided into 3 pick-up routes, namely Jl.Raya Sukasari, Jl.Raya K.H. Sholeh Iskandar, and Jl. Raya Pancasan Ciapus. The pick-up time to the Dramaga IPB campus is on Monday - Friday at 06:30, while the pick-up time from the IPB Dramaga campus is on Mondays at 16:00 and for Fridays at 16:30. towards the IPB dramaga campus. This off-campus bus program is a mode of transportation that plays a role in supporting the mobility of the IPB community to reach their destination on time or according to the departure schedule found at each pick-up place. Time is very important, especially for the IPB community who will undergo activities, so that the travel time from the pick-up place heading to Dramaga IPB must be in accordance with the specified schedule, so that the IPB community can estimate the travel time from the pick-up point to the destination. Travel Time is the length of time taken to travel a certain distance, so that the IPB community can reach their destination on time.

To support the Green Campus program in 2020, the chancellor issued a policy in the form of IPB Chancellor's Decree Number 205 / IT3 / LK / 2015 regarding the implementation of the 2020 green campus movement in the IPB environment. A green campus which is a higher education community that improves energy efficiency, conserves resources and improves environmental quality by educating to create a healthy life and a conducive learning environment in a sustainable manner, to achieve these goals, the Green Campus movement at IPB will be implemented through 4 elements, one of which is green transportation. The main modes of transportation on campus and off-campus transportation according to their priorities are walking, cycling, campus buses, and electric cars.

The development of transportation today is very dependent on the service mode of the vehicle. Transportation using private vehicles is still considered comfortable and is still needed, especially the middle and upper class. Because public transportation services are still below the standards of both the service and the conditions of the public transportation. So that people are still not interested in using public transportation in the near future (Maudiawan M et al, 2020); (Triyanto T et al, 2019); (Syaiful S et al, 2018); (Syaiful S, Elvira Y, 2017); (Syaiful S, 2017); (Hana K, Juang A, 2019); (Cicile FG et al, 2019). Especially public transportation whose condition is poorly maintained and looks dirty, so that people are reluctant to ride it. Especially public transportation whose sound is noisy, the exhaust is not standard or has the music playing loudly so it doesn't make other passengers comfortable (Syaiful S, Zainal A, 2017); (Syaiful S, Sri Wiwoho M, 2019); (Syaiful S, Lutfi A, 2015); (Syaiful S, 2015); (Syaiful S, Thamrin T, 2016); (Syaiful S, Wahid N, 2020).

### **Research purposes**

The purpose of this research is as follows, to find out the bus service outside the campus of IPB Dramaga in 2019. Analyze and calculate the bus service outside the campus of IPB Dramaga in meeting the minimum service standards for public transportation on the route.

### **Research limitations**

The problem limitation for this case study consists of a total of 255 users with 77 respondents constituting 30% of the total bus users, because the lowest percentage requirement in the Likert scale method is 30%. Meanwhile, the number of fleets. consists of 6 buses (3 big buses 3 small buses) with the total time of this study from June to October, by reviewing the following things that are reviewed including security, safety, comfort, affordability, equality and order.

### **Travel time**

Travel time is the total time required to pass a certain length of road, including stop-times and delays at intersections. Travel time does not include stopping for rest or vehicle repairs (MKJI, 1997).

Time travel is an important measure of system performance in the transportation sector. Actually, the travel time required for each road user to cross the road is influenced by many factors such as traffic volume, weather conditions, driver behavior and vehicle characteristics. It is impossible to predict or predict this random process for all drivers. As a result, travel time is defined as the average travel time over a certain period of time. Travel time estimation is the process of calculating the average road user to time based on traffic conditions. In general, condition recognition is carried out by direct monitoring to the field.

### **Speed**

Speed is the rate of movement of a particular traffic or vehicle which is often expressed in kilometers per hour. There are two categories of average speed. The first is the average time velocity, which is the average of a number of speeds at a certain location. The second is average space velocity or travel speed which includes travel time and drag. The average space speed is calculated based on the distance traveled divided by the travel time on a particular road. Speed is the amount of distance traveled by a vehicle divided by travel time (km / hour). The faster the speed a system can provide, the shorter the time it takes to reach its destination.

### **Transportation**

Transportation is a means of moving people or goods from one place to another. The goal is to help people or groups of people reach various places of interest, or to deliver goods from their place of origin to their destination, while public transportation is passenger transportation that is carried out with a rental or pay system. Included in the definition of passenger public transport are city transportation (buses, minibuses, etc.), trains, water transport and air transport.

Based on Government Regulation no. 41 of 1993 concerning Road Transportation, it is explained that transportation is the transfer of people and / or goods from one place to another by using a vehicle. Meanwhile, public transportation is any motorized vehicle provided for use by the public for a fee. The transportation of people by public transportation is carried out by using buses or passenger cars which are served by fixed or regular routes and not on routes.

### **Public transport service standards**

Effective service can be measured by referring to service standards that are legally regulated by the state in a law so that it can be implemented by the state apparatus in providing good and comfortable public services. The Service Standards for Public Transportation which have been regulated by the State are stipulated in the Law of the Republic of Indonesia Number 22 of 2009 concerning Road Traffic and Transportation in article 141 paragraph 2 concerning People Transportation Service Standards. The full description of the Service Standards is found in the Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 29 of 2015 concerning Amendments to the Regulation of the Minister of Transportation Number PM 98 of 2013 concerning Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on Routes. Described in the Personnel Transportation Minimum Service Standards, there are several explanations of the types of services listed in the Standards issued by the Government, namely as follows:

#### **Security**

##### **Vehicle ID**

The vehicle number and route name are in the form of a sticker affixed to the front and back of the vehicle.

##### **Crew identity**

###### **For driver**

1. Wearing a uniform and complete with the identity of the driver and company name;
2. Place the ID card board of the driver's name, driver's identification number and company name in the driver's room.

For the conductor, wearing a uniform and complete with the identity of the conductor and company name.

##### **Vehicle lights**

Serves as a light source in the bus car to provide security for service users.

##### **Tinted window**

Coating on vehicle glass to reduce direct sunlight.

##### **Warning signal light**

Lights provide information about dangerous situations in the vehicle.

#### **Safety**

##### **Vehicle crew**

Standard Operating Procedures (SOP) for vehicle operation

The driver must:

1. Prioritizing traffic safety and smoothness;

2. Carrying passengers who have tickets or pay according to a predetermined rate;
3. Carrying passengers not exceeding the specified capacity;
4. transferring passengers on the way to another similar vehicle on the same route without being charged an additional fee if the vehicle breaks down, breaks down, has an accident, or is ordered by an officer;
5. use the lane of the road that has been determined or use the leftmost lane, except when going overtaking or changing direction;
6. pick up and / or drop off passengers at the specified place;
7. Close the door while the vehicle is running;
8. comply with the maximum speed limit for public transport, and;
9. serving the passage according to the route permit given

### **Competence**

Drivers have the following knowledge, skills and behaviors:

1. knowledge of the routes served, the procedures for transporting people, and the procedures for traffic;
2. vehicle driving skills according to the type of vehicle;
3. Good attitude and behavior, respect and friendly towards passengers.

### **Physical condition**

1. the body is mentally and physically healthy and not under the influence of drugs and alcohol;
2. The driver is obliged to rest for a maximum of 15 (fifteen) minutes after driving the vehicle for 2 (two) consecutive hours.

### **Safety equipment**

Safety facilities in an emergency, installed in a place that is easily accessible and equipped with a description of the procedure for use in the form of a sticker, covering at least;

1. glass breaker;
2. light fire extinguishers, and;
3. lighting tools.

### **Medical facility**

Health facilities used for emergency handling of accidents in bus cars, in the form of First Aid equipment for accidents (P3K).

1. Emergency response information
2. Information in an emergency in the form of a sticker containing the telephone number and / or SMS of the complaint affixed to a strategic place and easily visible inside the vehicle.
3. Stand passenger facility
4. Handgrip facility for standing passengers for medium and large buses.
5. Passenger entrance and / or exit

6. Passenger entry and or exit doors must be closed while the vehicle is running.
7. Tires
8. The front tires are not allowed to use retread tires.
9. Curtain rails (curtain) on windows
10. The position of the curtain rails installed does not interfere with the evacuation in case of an emergency (when the glass must be broken).
11. Speed limiting tool
12. Speed limiting device installed on public transport vehicles.
13. The driver's exit and exit, at least for medium buses
14. For the bus engine which is behind there is no driver's door. For the machine in front, the door should only be used by technicians.
15. Electricity for audio visual that meets the Indonesian National Standard (SNI)
16. Power cable for supporting facilities.
17. Safety belt
18. Safety belt at least 2 (two) points (anchors) on all seats.

#### **Infrastructure**

Vehicle storage and maintenance facilities (pool)

Serves as a vehicle resting place, and also a vehicle for maintenance and repair.

#### **Comfort**

Carrying capacity

The vehicle operates to carry passengers according to the permitted carrying capacity.

Room temperature control facility

The facilities required to create the condition of the vehicle passenger room.

Cleanliness facilities

In the form of a trash can.

No smoking

In the form of stickers and with pictures and / or the words "No Smoking".

#### **Affordability**

Rates

Fees charged to service users for one trip. For non-economy class, ticket prices are in accordance with the service. For Economy class, it can be provided with subsidies.

#### **Equality**

Priority seating

Seats in buses intended for disabled people, elderly people, children and pregnant women.

Room for a wheelchair

A room reserved for passengers using wheelchairs.

### **Regularity**

Service information

Information that contains:

1. Departure;
2. Arrival;
3. Tariffs;
4. The route served.

### **Time stopped at a stop**

The time it takes to pick up and drop off passengers.

### **Headway**

Distance between vehicles.

### **Operational performance**

1. Providing certainty about the amount of service supply on the designated route;
2. In order for vehicles to operate economically and efficiently.

To measure each category in the Public Transportation Service Standards contained in the Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 29 of 2015 concerning Amendments to the Regulation of the Minister of Transportation Number PM 98 of 2013 concerning Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on the route the author uses a Likert scale. With a Likert scale, the variables to be measured are translated into variable indicators.

The Likert scale is a scale used to measure the perceptions, attitudes or opinions of a person or group regarding an event or social phenomenon, based on the operational definition set by the researcher. This scale is a psychometric scale commonly applied in questionnaires and is most often used for research in the form of surveys, including in descriptive survey research.

### **Campus Bus at IPB Dramaga**

Campus buses at IPB began to be implemented according to IPB Rector Decree Number 241 / IT3 / LK / 2015 on September 29, 2015 concerning Green Campus Transportation. And starting with the management of campus transportation vehicles. IPB has five gas-fueled campus buses which are a grant from PT Sinar Mas. The Green Transportation program, especially campus buses, which operate in four corridors. The bus has a seating capacity of 27 and 40 people including those who are standing.

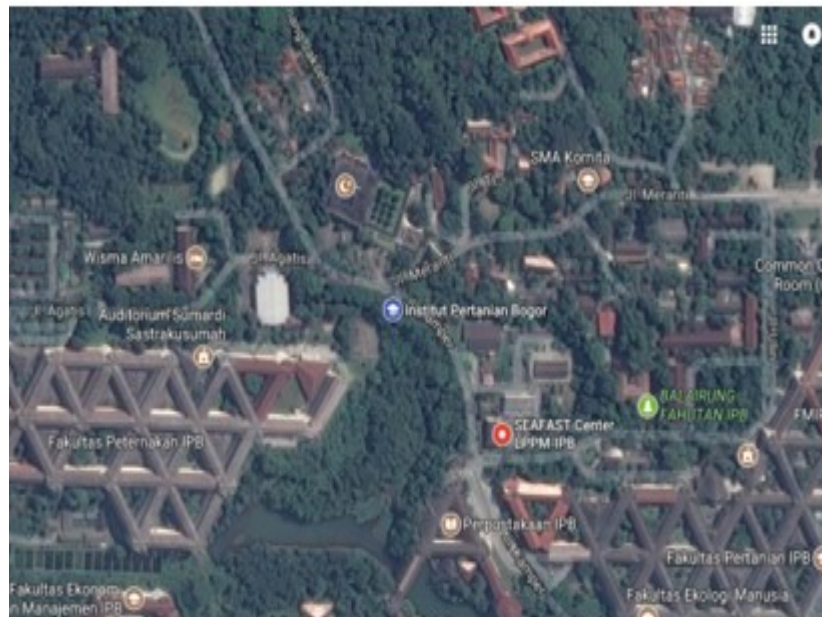


**Figure 1.** Campus Bus (Source: Private documentation)

## RESEARCH METHODS

### Place and time of research

When this research began in June and is expected to be completed in November 2019. The research site is on the bus route outside the Dramaga Bogor Campus of IPB. The location map is shown in Figure 2.



**Figure 2.** Location map (Source: google maps 2019)

### Research Flowchart

The research method is based on collecting secondary data and primary data and data analysis using the interview method. The research methodology is described in the stages of research as shown in Figure 3 below.

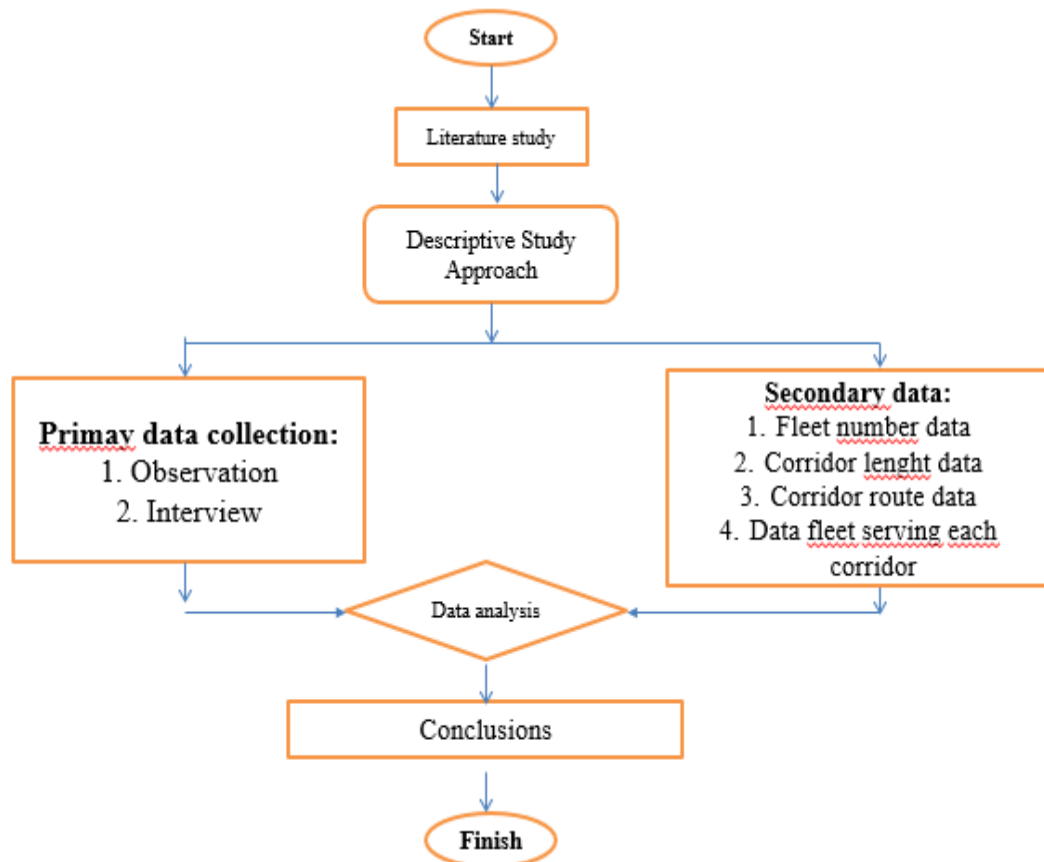


Figure 3. Research Flowchart

## RESULTS AND DISCUSSION

### Campus Bus Inventory

#### Number of Fleet

Off-campus bus services are divided into three lines and have a fleet of 6 buses consisting of 3 large buses 3 small buses. The bus will arrive according to a predetermined schedule and stop only at the stops that have been provided.

Currently, off-campus buses operate every Monday-Friday from 06.00-16.00. Large buses have a seating capacity of 54 and 66 people including those who are standing. Scheme arrangement of benches on the right, left, and back with the middle of a large free space to stand. Meanwhile, small buses have a capacity of 27 seats and 36 people including those who are standing. There are 3 bus stop points on all lines.

Table 1. Number of Bus Fleets Outside the Dramaga Campus of IPB

No	The route followed	Number of bus stops passed	Transportation type	Number of fleets
1	Jl Raya Sukasari to Campus IPB Dramaga		Big bus	1
2	Jl Raya Sukasari to Campus IPB Dramaga	1	Small bus	1



3	Jl Raya KH Sholeh Iskandar to Campus IPB Dramaga		Big bus	1
4	Jl Raya KH Sholeh Iskandar to Campus IPB Dramaga	1	Small bus	1
5	Jl Raya Pancasan Ciapus		Big bus	1
6	Jl Raya Pancasan Ciapus	1	Small bus	1
	Amount	3		6

### Corridor Length

The length of the corridor served by campus buses is based on data from PT. BLST is shown in Table 2.

**Table 2.** Length of the Dramaga Campus Bus Corridor

No	Route	The route followed	Path lenght
1	01	Baranangsiang via Jl Raya Sukasari to IPB Dramaga	16
2	03	Baranangsiang via Jl Raya Pancasan Ciapus to IPB Dramaga	15
3	04	Baranangsiang via Jl Raya KH Sholeh Iskandar	18
Total			49

### IPB Dramaga Campus Bus Performance in 2019 Security

**Table 3.** Vehicle Safety Standards on the Bus Outside the Dramaga Campus of IPB

No	Perception	Respondents	Scores	Total score
1	Very good	23	5	115
2	Good	29	4	116
3	Pretty good	16	3	48
4	Not good	5	2	10
5	Not very good	2	1	2
	Total	77		291
The result			75,58%	

Based on the results of research obtained from 77 respondents, on this security indicator, the percentage of the answer score is 75.6%, so it can be said that the IPB Dramaga campus bus service has implemented safety standards, such as the number of vehicles, drivers and kernet for the IPB Dramaga campus bus transportation. uniform and complete with name identification, and on all IPB Dramaga campus bus transportation there is a layer on the glass which serves to reduce the entry of direct sunlight.

### Safety

**Table 4.** Safety Standards on the Bus Outside the Dramaga Campus of IPB

No	Perception	Respondents	Scores	Total score
1	Very good	12	5	60
2	Good	29	4	116
3	Pretty good	27	3	81

4	Not good	6	2	12
5	Not very good	3	1	3
	Total	77		272
	The result		70,64%	

Based on the research results obtained from 77 respondents, on this safety indicator, the percentage of the answer score is 70.64%, so it can be said that the bus service outside the IPB Dramaga campus has implemented safety standards, such as orderly drivers in traffic, closing doors while the vehicle is running, know the route served, be kind to passengers, and have provided several safety facilities.

### Comfort

**Table 5.** Comfort Standards on the Bus Outside the Dramaga Campus of IPB

No	Perception	Respondents	Scores	Total score
1	Very good	16	5	80
2	Good	32	4	128
3	Pretty good	22	3	66
4	Not good	6	2	12
5	Not very good	1	1	1
	Total	77		287
	The result		74,54%	

Based on the research results obtained from 77 respondents, on this comfort indicator, the answer score is 74.54%. So it can be said that the IPB Dramaga campus bus transportation service has been running in accordance with the Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on Routes as stated in the Regulation of the Minister of Transportation of the Republic of Indonesia Number 29 of 2015.

### Affordability

**Table 6.** The Out-of-Campus Bus Affordability Standards of IPB Dramaga

No	Perception	Respondents	Scores	Total score
1	Very good	15	5	75
2	Good	37	4	148
3	Pretty good	20	3	60
4	Not good	4	2	8
5	Not very good	1	1	1
	Total	77		292
	The result		75,84%	

Based on the research results obtained from 77 respondents, this indicator of affordability got a percentage of the answer score of 75.54%. So it can be said that the IPB Dramaga campus bus transportation service has been running in accordance with the Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on the route as stated in the Regulation of the Minister of Transportation of the Republic of Indonesia Number 29 of 2015. This can be seen because the manager is PT. BLST

### Equality

**Table 7.** Equivalence Standards on Off-Campus Buses of IPB Dramaga

No	Perception	Respondents	Scores	Total score
1	Very good	0	5	0
2	Good	0	4	0
3	Pretty good	13	3	39

4	Not good	43	2	86
5	Not very good	21	1	21
	Total	77		146
	The result		37,92%	

Based on the research results obtained from 77 respondents, this equality indicator got a percentage of the answer score of 37.92%, which is the lowest value of all the indicators studied. So it can be said that the IPB Dramaga campus bus transportation service is not fully in accordance with the Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on the route as stated in the Regulation of the Minister of Transportation of the Republic of Indonesia Number 29 of 2015. In this equality indicator based on observations made by researchers, it can be known that priority seats are not yet available for passengers with disabilities / disabilities in the Dramaga IPB campus bus transportation.

### Regularity

**Table. 8.** Regularity Standards on the Bus Outside the Dramaga Campus of IPB

No	Perception	Respondents	Scores	Total score
1	Very good	16	5	80
2	Good	36	4	144
3	Pretty good	11	3	33
4	Not good	9	2	18
5	Not very good	5	1	5
	Total	77		280
	The result		72,72%	

Based on the research results obtained from 77 respondents, on this regularity indicator, the percentage of the answer score is 72.72%. So it can be said that the IPB Dramaga campus bus transportation service has been running in accordance with the Minimum Service Standards for Public Transportation of People with Public Motorized Vehicles on Routes as stated in the Regulation of the Minister of Transportation of the Republic of Indonesia Number 29 of 2015.

### Percentage of Questionnaires From Campus Bus Service Standards

To find out the interval from the Likert scale as a reference for assessment to be more specific and interpretation of the percent in order to find out the assessment by the method of finding the percent score interval (I).

$$I = 100 / \text{Total Score}$$

$$\text{Then} = 100/5 = 20$$

$$\text{Result (I)} = 20$$

The result of the calculation of the interval above is the interval from the lowest 0% to the highest 100%, the following are the criteria for interpreting the score based on the interval.

**Table 9.** Likert Scale Intervals

No	Percentage	Catagory
1	0,00% - 19,99%	Not very good
2	20,00% - 39,99%	Not good
3	40,00% - 59,99%	Pretty good
4	60,00% - 79,99%	Good
5	80,00% - 100,00%	Very good

Based on research on IPB campus bus service standards using measurements through indicators from the Regulation of the Minister of Transportation of the Republic of Indonesia Number PM 29 of 2015 concerning Amendments to the Regulation of the Minister of Transportation Number PM 98 of 2013 concerning Minimum Service Standards for Public Transportation of People with Public Motor Vehicles on Routes which include: Security, Safety, Comfort, Affordability, Equality and Regularity, are shown in table 10 below.

**Table 10** Minimum Service Standards with Percentages and Categories

No	Standards	Percentage	Category
1	Security	75,58%	Good
2	Safety	70,64%	Good
3	Confort	74,54%	Good
4	Affordability	75,84%	Good
5	Equality	37,92%	Bad
6	Regularity	72,72%	Good
<b>Average</b>		67,87%	Good

Based on the table above, it can be interpreted that the standard of outside-campus bus service of IPB Dramaga is declared good because the average percentage result using the Likert scale method shows a value of 67.87% which means that the off-campus bus service of IPB Dramaga is in the good category based on the Likert scale interval.

## CONCLUSION

The results of the analysis using the Likert scale method get an average percentage of the answer score of 67.87% which indicates that the bus service outside the campus of IPB Dramaga Bogor. Based on the research results obtained from 77 respondents, all indicators of the Minimum Service Standards for People Transportation with Public Motorized Vehicles on the Route are in the good category, so it can be said that IPB Dramaga's off-campus bus transportation services have been running in accordance with the Regulation of the Minister of Transportation Number PM 98 Years 2013 concerning Minimum Service Standards for Public Transportation of People on Public Motorized Routes

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